

“mio” is million; “t” is tons; and “p.a.” is per annum (Latin for “per year”).

The claims have been amended to alleviate issues raised by the Examiner in the Office Action and to emphasize patentable features of the invention. It is respectfully considered that no new matter is introduced into the application by the Amendment. It is respectfully considered that the Examiner’s rejection of claims under 35 U.S.C. 1112, second paragraph, is moot in view of the amendment of the claims.

As to the substantive rejection provided in the outstanding Office Action, claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant’s admitted prior art. Claim 1 has been also rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent 4,318,710 to Pilipski (the Pilipski Patent hereinafter). Claims 3 and 4 have been rejected under 35 U.S.C. 103(a) as being obvious over the Pilipski Patent as applied to claim 1 and further in view of U.S. Patent 4,101,292 to Hogan II (the Hogan Patent hereinafter). Applicant respectfully considers that the above-discussed rejections are moot in view of the claims amendment provided in the application.

The present times are characterized by balancing the generated energy and the consumed energy, as well as problems which are due to the amount of carbon dioxide released into the atmosphere during the energy generation by combustion of fossil

fuels. These problems are additionally compounded by the realization that the sources of fossil fuel are not infinite but limited. Therefore, other power sources are also utilized such as, for example, wind energy, tidal flow energy, hydroelectric power and solar power. While utilization of solar energy appears quite promising in view of its virtual unlimited world-wide availability, such energy is available only during day-time and is dependent upon the respective weather conditions. Furthermore, current uses of solar energy by means of photovoltaic cells or heat storage permit only limited storage thereof.

As discussed in the present application, the large amount of solar energy is utilized in forestry for growing trees in which the solar energy is stored in the form of chemical compounds as a result of CO_2 assimilation. Therefore, forests constitute a world-wide sink of atmospheric CO_2 and additionally contribute thereto due to the fact that large amounts of such wood are used for manufacturing products which are not subjected to oxidation or other processes in which CO_2 is released. The present invention also arises from considering that the undesired greenhouse effect results from the fact that the rate of atmospheric CO_2 generation, due to the combustion of carbon containing fuel, is higher than the rate of atmospheric CO_2 reduction as caused, inter alia, by assimilation in forests. Thus, the invention is based on the consideration that wood obtained from forests can be converted by known processes into charcoal which is stable and indefinitely storable as

long as it is not subjected to oxidizing conditions. Due to such favorable properties, charcoal obtained from harvested wood constitutes a material in which solar energy is stored. Contrary to other known solar energy usages, the solar energy stored in the form of charcoal can be stored for extended periods of time.

Thus, while a respective amount of carbon dioxide is removed from the atmosphere during each vegetation period, the amount of CO₂ released to the atmosphere during such vegetation period depends on what amount of the harvested wood is consumed with concomitant CO₂ release. When CO₂ is removed from the atmosphere in the greater amounts than that released into the atmosphere, the undesired greenhouse effect is correspondingly decreased. The stored charcoal, however, is not lost but available for energy generation by oxidative processes at any time, whenever conditions require, and permit the concomitant release of CO₂ without causing or unduly increasing the greenhouse effect.

It is respectively considered that the rejection of claim 1, under 35 USC 103(a) as being obvious over the Applicant's admitted prior art is not completely sustainable. Applicant respectfully disagrees with equating the term "wooden product" as used in the recited part of the specification with the term "wood products". In the opinion of the applicant, the term "wooden products" relates to products which are made of wood and

thus still have the material character or nature of the respective wood or in which this material character or nature is only insignificantly changed – such as, for example, in the case of wooden furniture, etc. Obviously, the invention does not suggest to first convert such wooden products into charcoal and, then, subject the charcoal to combustion for energy production.

Contrary thereto, the term “wood products” (as used by the Examiner) is an all-inclusive term encompassing all kinds of products which are produced from wood and which have totally or at least significantly lost the material character or nature of the respective wood, such as, for example, cellulose or charcoal.

To further support this argument, a copy and a literal translation of the recited publication [i.e., “Unser Wald” (“Our Forest”) by the Bundesministerium für Ernährung, Landwirtschaft und Forsten (Federal Office of Food, Agriculture and Forestry)] are enclosed as Exhibit 1. Applicant considers that it is evident from the specification of the instant application as well as the translation of the reference, that the reference is exclusively concerned with the production of wooden products from harvested wood. In fact, the entire reference does not even mention the term “charcoal”.

In view of the above, it is unclear and not understood to which “artisan” the

Examiner is referring to in her rejection. The reference exclusively relates to products made of wood (with the exclusion, maybe, of paper); consequently, the related artisan can be assumed to be concerned with harvesting wood and processing the same for obtaining the wooden products as noted on page 42 of the reference. Clearly, such artisan should not be concerned with the production and storage of charcoal in relation to the atmospheric CO₂ level and in conjunction with present problems of energy generation and consumption. While such artisan may have read in the newspapers about the greenhouse effect and the positive effect of forests thereon, he could not in the least figure as an artisan with respect to the greenhouse effect.

Thus, the reference does neither teach nor suggest the method as claimed in claim 1. Particularly, and contrary to the Examiner's assumption, the skilled artisan does not receive the slightest teaching with respect to charcoal from the reference. Therefore, the Examiner's arguments appear to be based upon hindsight consideration which became available only after study of the instant application.

With respect to the rejection of claim 1 in view of the Pilipski patent, the following should be noted:

According to the object statement in col. 1, lines 64 to 67, Pilipski intends "to

provide a process for converting wood stock and any biomass having a significant cellulose content into charcoal". Pilipski further indicates that, since the wood stock and the cellulose contained therein are produced by photosynthesis, the charcoal is a potential source of fuel of extraordinary magnitude and is derived from wood, thus representing a renewable and effectively inexhaustible fuel source (col. 1, lines 43-54).

The Pilipski patent is mainly concerned with the process of converting cellulosic material into charcoal by treating the cellulosic material with anhydrous liquid hydrogen halide at ambient temperature. Furthermore, the Pilipski patent considers transportation of the charcoal and reports values obtained for the heat of combustion of charcoal. The Pilipski patent teaches the many advantages of charcoal over wood as a fuel and is concerned with exclusively using charcoal as fuel for providing energy.

The Pilipski patent, however, is not at all concerned with the greenhouse effect and the fact that the combustion of charcoal results in carbon dioxide in an amount of 3.67 kg or 1.87 m³ per kg of charcoal. Presently the greenhouse effect is believed to be caused by an imbalance between the increase in the atmospheric CO₂ level due to organic fuel combustion and the decrease in the atmospheric CO₂ level due to assimilation in forests.

In fact, and as explained in the first paragraph on page 4 (of the originally filed translation of the instant application), a balanced atmospheric CO₂ level can only be restored by reducing the rate at which CO₂ is released into the atmosphere and/or by increasing the rate at which CO₂ is absorbed from the atmosphere.

Contrary thereto, the Pilipski patent is only concerned with providing charcoal as a renewable energy source, i.e, with charcoal as a fuel irrespective of the CO₂ which is produced as a result of charcoal combustion. The present invention, however, is directed to the rates at which CO₂ is absorbed from and released into the atmosphere in that (i) the assimilation of CO₂ by forests is increased by withdrawing part of the harvested wood from the carbon cycle due to the prolonged storage of the charcoal formed therefrom and (ii) the combustion of the charcoal for energy generation is limited by the requirement that the amount of CO₂ produced thereby be compatible with reducing the greenhouse effect.

It must be further considered that the Pilipski patent utilizes practically all of the produced charcoal as a fuel; only a comparatively miniscule amount is merely analytically used for determining the heat of combustion.

Therefore, the Pilipski patent neither teaches nor suggests storing for an extended

period of time a first charcoal portion and using only a remaining second portion as a fuel, whereby the remaining second portion, which is intended to be used as a fuel, is selected such as to be compatible with prevailing requirements regarding the atmospheric CO₂ level.

New claims 8 and 9 submitted in the Response relate to storing the first portion of the charcoal under an inert gas or CO₂, respectively. As noted above, the first portion of charcoal constitutes that portion of the charcoal which is intended to be stored for an extended period of time. Thus, for the extended time period, this first portion of charcoal is not intended to be used as a fuel but is instead to be removed from the atmospheric carbon cycle (which includes the step of releasing CO₂, which is generated by combustion, to the atmosphere and the step of reducing the atmospheric CO₂ level by assimilation in forests).

Contrary thereto, the Hogan II patent like the Pilipski patent intend to use practically the entire amount of produced charcoal as a fuel (Pilipski for energy generation, Hogan II for self-ignitable briquette beds [col. 4, lines 36-39]). The Hogan II patent teaches placing charcoal briquettes 10 into a plastic bag 12, purging air, i.e., oxygen, from the plastic bag and replacing the air with an inert gas through a conduit 16, collapsing the bag 12 on the briquettes 10 either by evacuation through the conduit 16 or

by thermally shrinking the bag 12 (Fig. 3), sealing the bag 12 at the end 18, tightly wrapping a paper sack 34 around the bag 12, impregnating the paper sack 34 with an inflammable liquid (which may or may not be used to also impregnate the charcoal briquettes 10 prior to filling the plastic bag 12). One or more of thus obtained units 14 may be placed into a gas impermeable plastic bag 38 in which the air, i.e., the oxygen may be replaced with an inert gas.

It should be noted that the inert gas is employed in order to prevent unintended inflammation which may occur due to the impregnation of the charcoal and/or the paper sack 34 with an inflammable liquid. Such inflammable liquid is employed for use in order to melt the plastic bag 12 and facilitate ignition of the charcoal, (see col. 4, lines 36 to 53).

Consequently, the Pilipski patent as well as the Hogen II patent are exclusively concerned with the use of charcoal as a fuel and, maybe, temporary storage. Specifically, the Hogan II patent employs the inert gas protection not in the least for protecting the charcoal from oxidation but instead to “minimize odors or vapor contamination in storage areas, maintain the ability of the liquid impregnant to ignite the charcoal briquettes 10, and minimize fire hazards due to impregnant vapors.” (col. 3, lines

47-51). Thus, the inert gas protection by the Hogan II patent is required due to the presence of a readily inflammable impregnant. Since new claims 8 and 9 are dependent upon claim 1 and neither the Pilipski patent nor the Hogan II patent consider storing a first portion of the charcoal for an extended period of time (as now claimed in amended claim 1), these references are believed to neither as such nor in their combination suggest or anticipate the subject matter of new claims 8 and 9. Furthermore, since new claims 10 and 11 likewise are dependent upon claim 1 and neither the Pilipski patent nor the Hogan II patent consider a remaining portion of the charcoal (as now claimed in amended claim 1), these references are believed to neither as such nor in their combination suggest or anticipate the subject matter of new claims 10 and 11.

Furthermore, applicant respectfully considers that the arguments presented hereinabove are also applicable to new independent claims 13, 14 and 22 and other claims dependent thereupon. In this respect, the Pilipski reference is not at all concerned with the storing of the obtained charcoal, so that its combination with the Hogan II patent is concerned with more or less immediate use of the entire amount of fuel-impregnated charcoal for the combustion purposes.

Referring now to the references cited by the Information Disclosure Statement

which accompanies this Response. The undersigned has been informed by the applicant that the German Patent Office has recently issued an Office Action in the corresponding German Application, S.N. 199 42 398.9 citing the following references: (1) German Published Patent Application No. 4,035,927 A1 published 5/14/92 (the '927 Publication hereinafter) and (2) German Published Patent Application No. 3,526,879 A1 published 2/5/1987.

The '927 Publication

The '927 Publication is entitled "Method of and Apparatus for, Utilizing Hydrocarbons and Biomasses". The description starts with a consideration of the methods of generating energy by combustion of hydrocarbons and biomasses and the negative effects which result from the concomitant production of carbon dioxide. Accordingly, the object of the invention is stated in col. 2, lines 16-19, as follows: "The invention is based on the object of respectively providing a method and an apparatus which enable an entirely environmental-friendly utilization of hydrocarbons and biomasses."

In Figs. 1-6 of the '927 Publication, a number of exemplary embodiments are described. Generally, all of these exemplary embodiments are based upon the thermal decomposition of hydrocarbons with the exclusion of air at temperatures in the range of 600-1000° C (col. 5, lines 44-46). The required process energy is provided by means of

nuclear or solar reactors or by combustion of parts of the hydrogen formed in the process. Under these conditions, the hydrocarbons are completely decomposed with the formation of hydrogen and carbon. "The hydrogen thus formed is taken from the reactor for energetic utilization whereas the carbon is conducted away for non-energetic use and, if desired, stored or disposed of" (col. 5, lines 49-53).

With respect to biomasses, no examples are given and there is only the following statement in col. 3, lines 33-37: "In the inventive method, the biomasses are heated in the dry state with the exclusion of air. Thereby, only the carbon dioxide, which is contained in the biomass, will be released wherefore no reaction energy is required and the major part remains as carbon." In the following text in col. 3, lines 37-54, this is explained with reference to cellulose by means of a numerical calculation on the basis of the general formula of cellulose, however, no experimental data are disclosed.

Consequently, the '927 Publication is directed to providing a process for producing hydrogen from hydrocarbons (allegedly also from biomasses) with total exclusion of any release of CO₂ by thermal decomposition at temperatures in the range of 600-1000° C. The total resulting carbon, as stated, is either non-energetically used or, if desired, stored or disposed of.

Contrary thereto, it is the object stated in the instant application to provide a

method of producing and storing solar energy while simultaneously effecting a reduction in the CO₂ content of the air. The invention is exclusively concerned with photo synthetically produced biomasses which can be converted into charcoal. Such conversion for producing charcoal from a biomass such as, for example, wood is known to operate with the exclusion of air at temperatures in the range of 300-500° C. As a result of such process, there are formed, in addition to charcoal, gaseous products which contain, with the exclusion of water vapor, 49% CO₂, 34% CO, 13% methane, 2% ethylene and 2% hydrogen (Römpps Chemielexikon, 8th ed. 1983, vol. 3, p. 1737, 1-h. col, entry "wood gas").

Consequently, the method according to the '927 Publication is unsuited for producing hydrogen as an energy source.

The charcoal, which is obtained according to the instant application, is utilized in two different ways, namely (i) by storing a predetermined substantial fraction for a long time and (ii) by energetically using a remaining portion of the charcoal. As a result, the predetermined substantial portion of the stored charcoal is made unavailable for any CO₂ – producing combustion processes and thus contributes to reducing the amount of CO₂ in the air. In fact, and considering that the charcoal is obtained from a biomass which is photo synthetically formed under the action of the sun, the stored charcoal

constitutes stored solar energy. As a further result, the remaining charcoal portion, contrary to the “927 Publication, is energetically used in an amount or in a manner such that the amount of CO₂ produced thereby, does not negatively affect significantly the environmentally required reduction in the CO₂ content of the atmosphere. Consequently, the method according to the invention results in a reduction of atmospheric CO₂ despite energetic use of a limited charcoal portion.

In summary, Applicant respectfully considers that the ‘927 Publication neither teaches nor suggests the invention as described and claimed in the instant application.

The ‘879 Publication

The ‘879 Publication is cited against claims 3-5 which correspond to claims 3 to 5 of the instant US application. The ‘879 Publication is entitled “Method of, and apparatus for, preventing fires or explosions or the course of undesired reactions upon access of air to goods which are located within a bounded volume particularly fuel to be transported in tank or silo semi-trailer trucks or chemical products to be transported.”

The object to be achieved by the ‘879 Publication is disclosed as follows (col. 4, lines 25 to 37): “The invention is based on the object of providing a method of preventing in bounded volumes the formation of explosive mixtures or treating mixtures

approaching the critical composition in a manner such that the sub-critical composition is either restored and/or maintained or that it is a priori ensured that occurring fires and explosions are extinguished within the shortest time period and their propagation is prevented, that deflagrations and explosions are prevented or stopped and that also undesired reactions, particularly of chemical products, are prevented by averting the access of air.”

Furthermore, according to col. 3, lines 26-66 of the ‘879 Publication, the related goods are liquid, liquefied or gaseous goods, bulk materials such as powders; indeed all goods capable of forming explosive mixtures with ambient air, of selfignition due to air access or of frictionally forming electric charges causing ignition by discharges. Other goods constitute dry chemical products like plant protecting agents, lacquer or drug forming products, liquid products like spraying agents, also medical wastes originating from doctors, hospitals, apothecaries; chemical products entering undesirable chemical reactions upon access of air, such as chlorine, oleum, amino compounds; coal and coal dust. “Bounded volumes” are defined with respect to stationary or movable tanks, silos, containers of all kinds designed for road, rail and waterway transport as well as mills, bunkers, garbage trucks, department stores and floors thereof.

According to col. 4, lines 42-46 of the ‘879 Publication, the stated object is

achieved by “providing or maintaining, either on top of or within the goods present in the bounded volume, an inert gas atmosphere.” According to col. 7, lines 19-25, the inert gas may constitute a gas which does not chemically react with the respective good, particularly nitrogen, carbon dioxide, halon.

Consequently, the subject matter claimed as such in claims 3 to 5 may be considered to be either anticipated or rendered obvious by ‘879 Publication.

However, it should be taken into account that claims 3 to 5 are directly or indirectly dependent upon claims 1 and 2 and, therefore, their subject matter must be considered in conjunction with the subject matter of claims 1 and/or 2. As explained hereinabove, ‘927 Publication neither anticipates nor renders obvious claims 1 and 2, as well as other claims introduced by the Response. Also, as will be evident from the foregoing discussion, the subject matter of claims 1 and 2 is neither affected by ‘879 Publication. Consequently, any conceivable combination of ‘927 Publication and ‘879 Publication neither teaches nor suggests the subject matter of claims 3 to 5 when combined with the subject matter of claims 1 and/or 2 or any other claim currently of record in the Application.

Withdrawal of the Examiner’s rejection and allowance of all claims currently of

record in the present application are respectfully requested in view of the above Amendments and Remarks.

A Certified copy of German Patent Application 199 42 398.9 filed September 6, 1999 priority of which is claimed by the present application, accompanies this Response.

III Version Of Claims And Paragraphs Of Specification
With Markings To Show The Changes Made

1. A method of storing solar energy, said method comprising the steps of:

producing by photosynthesis an amount of biomass capable of forming charcoal;

converting said amount of biomass into charcoal;

[extendedly storing of a predetermined substantial fraction of said charcoal;]

retrievably bunkering a first portion of said charcoal for an extended period of time and thereby reducing the CO₂ emission into an atmosphere and a concomitant greenhouse effect by an amount similar to that generated by combustion of either said first portion of said charcoal or the corresponding amount of said biomass; and

converting of a remaining portion of said charcoal into energy or an energy source with concomitant release into the air of a corresponding amount of CO₂;

whereby [said corresponding amount of CO₂ released into the air during said step of converting of said remaining portion of charcoal into energy or an energy source being reduced as compared to the amount of CO₂ released into the air when the entire amount of said biomass is converted into energy or an energy source] in said step of converting of said remaining portion of said charcoal into energy or an energy source said remaining portion of said charcoal is limited to an amount which, as a result of such conversion, generates an amount of CO₂ compatible with the respectively desirable

atmospheric CO₂ level.

2. (amended) The method as claimed in claim 1, wherein said remaining portion of said charcoal is [utilized for producing of hydrogen] converted by chemical reaction to produce hydrogen as an energy source.

5. The method as claimed in claim 1, wherein said step of [extendedly storing] retrievably bunkering said [substantial fraction] first portion of said charcoal for the extended period of time [entails] further comprises storing said [substantial fraction] first portion of said charcoal in at least one subterraneous cavity.

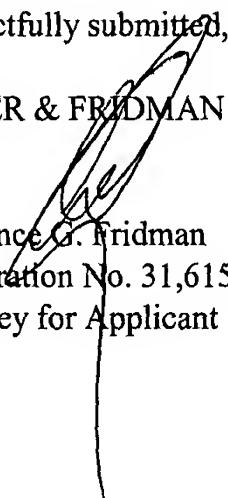
6. The method as claimed in claim 5, wherein said step of [extendedly storing] retrievably bunkering said first portion [substantial fraction] of said charcoal for the extended period of time in at least one subterraneous cavity further comprises selecting said subterraneous cavity from a coal mine, an ore mine or a salt mine.

7. The method as claimed in claim 1, wherein said step of [extendedly storing] retrievably bunkering said first portion [substantial fraction] of said charcoal for the

extended period of time, further comprises [entails] storing said first portion [substantial fraction] of said charcoal in an above-ground bunker facility.

Respectfully submitted,

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PTOESP1_217

Translator's Certificate

I, Dipl.-Chem. Dr. Rudolf Wolgast of Ludwig-Beck-Strasse 12 at 37075 Göttingen, Germany, do hereby declare that I am conversant with the German and English languages. I declare further that I am the translator of the document in the German language attached hereto and that to the best of my knowledge and belief the following is a true and correct translation of the said document.

Göttingen, December 9, 2002

Rudolf Wolgast

Exhibit 1

TRANSLATION

Cover page:

Emblem; Federal Ministry
of Food, Agriculture
and Forestry

Title: Our Forest

Nature and Economic Factor at the same time

Forest Illustration

Back of Title Page:

Title, inserted by the inventor in hand-writing, "Our Forest"

Editor:

Federal Ministry of Food, Agriculture and Forestry (BML)
Department of Public Information
PO Box
53107 Bonn
Internet: [http:// www.bml.de](http://www.bml.de)

Lay-out:

Dr. Mänken GmbH
53127 Bonn

Photos:

agenda (7), aid (2), Bavaria (16), Bavarian State Forest Administration (1), BMZ (4), BPA (3), CMA (1), Gaertner (1), GTZ (1), Heyder (1), Hooge (16), IFA (17), Kant (5), KfW (1), Schmidt (5), Schönemund (3), Schröder (2), SDW (1), Stubbe (1), Ullmann (1)

Printer:

Bonifatius GmbH
33042 Paderborn

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Page 41, left-hand Column:

Wood is an environmentally friendly, multiply usable re-growing raw material. Its "production" is accompanied by multiply ecologically important effects. The sale of wood ensures forestry incomes which may also be used for measures enabling protective as well as relaxation functions for the forest. Comparatively little energy is required for producing and processing wood. Wood left to nature fits in with the natural cycle without leaving environmentally burdening residues. The increasingly important discussion concerning the greenhouse effect may result in a renaissance of wood as sustainably renewable energy source.

The Wood Industry

Merely in terms of numbers, the wood industry has a relatively modest role in Germany's economy. Together with the paper industry, the wood industry generated a turn-over of 167 billions DM in 1997; in 1997, approximately 700,000 employees were employed in the wood industry. This corresponds to a proportion of about two percent of all employees. Wood industry as well as forestry is of particular importance for the regional economy and the rural employment structure since wood industry and forestry are predominantly composed of small and medium businesses and mostly located in rural areas. Merely with respect to individual sectors with intense capital requirements such as the wood material or paper industry, few suppliers predominate with high market shares. Not only in Europe, but throughout the world Germany is one of the most important "wood countries". This is true with respect to production as well as foreign trade concerning wood and wood

Page 41, right-hand column:

products. The most important trading partners are the EU (European Union) member states. Despite a high sustainably usable wood growth of 57 million m³ per year, which, however, is used only up to 70 percent, and a top waste paper use of 59 percent in

international comparison, Germany is still not in a position to satisfy the demand of wood and products from German forests. Due to the absence of internal production capacities, sulfate pulp, which forms the highest deficit component, must be obtained nearly completely in the world market.

Photo illustration showing piles of cut wood boards.

Raw material wood: Multiply usable and environmentally friendly 41

* * *

Page 42, left-hand column:

There is no specific government support for the wood and paper industry. However, these industries benefit from measures which are generally directed to furthering the structure and the technical progress.

1997 wood consumption amounted to about 90 million m³ equivalents of raw wood. This corresponds to a per capita consumption of about 1.1 m³ of raw wood equivalent. Thus, Germany takes a medium position in international comparison. This consumption data includes not only raw wood and residual wood but also wood, which is used for the manufacture of semi-finished and finished goods, as well as waste paper and used wood.

Forestry has harvested and sold about 38 million m³ of raw wood in 1997. Alone the sawing industry has taken up more than half of this amount. Since the sawing industry moreover relies upon the higher-valued round timber, this is by far the most important forestry partner.

Photoillustration: Paper production

42 Raw material wood: Multiply usable and environmentally friendly

Page 42, right-hand column:

Total Stock of Wood Germany 1997 ¹⁾ Million cm ³ (converted into raw wood equivalents)			
Amount		Residue	
Harvest (calendar year)	38.2	Stock building	0.5
Waste paper, domestic	32.7	Export	67.4
Waste wood for material utilization	2.5	Computed consumption	89.4
Import	83.9	-	-
Stock reduction	-	-	-
Total amount	157.3	Total remainder	157.3

¹⁾ Temporary result

Wood Machining

Wood machining encompasses the manufacture of sawed timber, spaned goods, veneers, ties, masts and wooden materials. Also, wood impregnating businesses are included in this first production stage. The most important sectors thereof are the sawing industry and the chip board manufacturing industry.

Photoillustration: Sawed timber

Wood Processing

Wood processing entails the manufacture of furniture, furniture elements, packing materials, turned (lathe) wooden goods, brushes etc.

Photoillustration: House interior

The following is a translation of relevant, underlined sentences from pages 43 and 45:

Page 43:

The turnover in wood processing is predominantly generated by the wood and upholstered furniture industry. ...

The rising prefab and wooden house industry is of increasing importance for forestry. ...

The wood-working trade, furniture producing trade and the wood-related building trade is defined by about 50,000 small enterprises. ... 1997 300,000 employees found work in these trades. The turnover amounted to about 8.7 billion DM in the wood-working trade, about 3.9 billion DM in the furniture producing trade and 25.5 billion DM in the wood-related building trade.

Page 45:

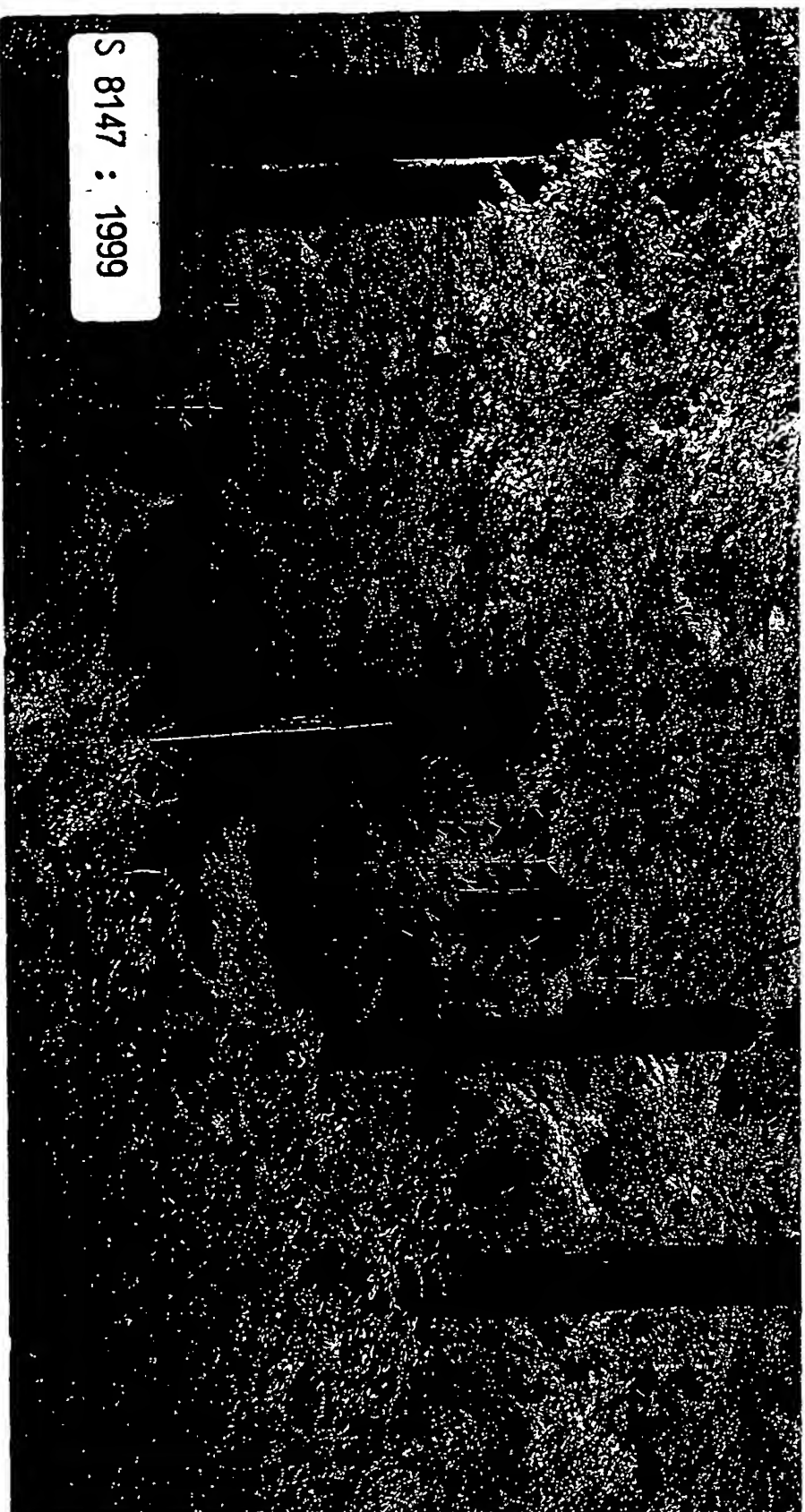
The ecological advantages of wood as a raw material are still only insufficiently appreciated. In one aspect, wood constitutes a renewable energy source which is neutral with respect to carbon dioxide. Use of hitherto non-utilized potentials of wood as an energy source may improve climate protection. ... Furthermore, producing and processing wood frequently requires less energy in comparison to other raw materials; this results in reduced loads on the environment. Finally, increased utilization of long-lived wood products results in long-term fixing of carbon which is bound by trees in the form of wood. This also counteracts the greenhouse effect.



Bundesministerium
für Ernährung, Landwirtschaft
und Forsten

Unser Wald

Natur und Wirtschaftsfaktor zugleich



S 8147 : 1999

„Unser Wald“

Herausgeber:

Bundesministerium für Ernährung,
Landwirtschaft und Forsten (BML)
Referat Öffentlichkeitsarbeit
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Fotos:

agenda (7), aid (2), Bavaria (16), Bayerische Staatsforstverwaltung
(1), BMZ (4), BPA (3), CMA (1), Gaertner (1), GTZ (1), Heyder (1),
Hooge (16), IFA (17), Kant (5), KfW (1), Schmidt (5), Schöne-
mund (3), Schröder (2), SDW (1), Stubbe (1), Ullmann (1)

Druck:

Bonifatius GmbH
33042 Paderborn

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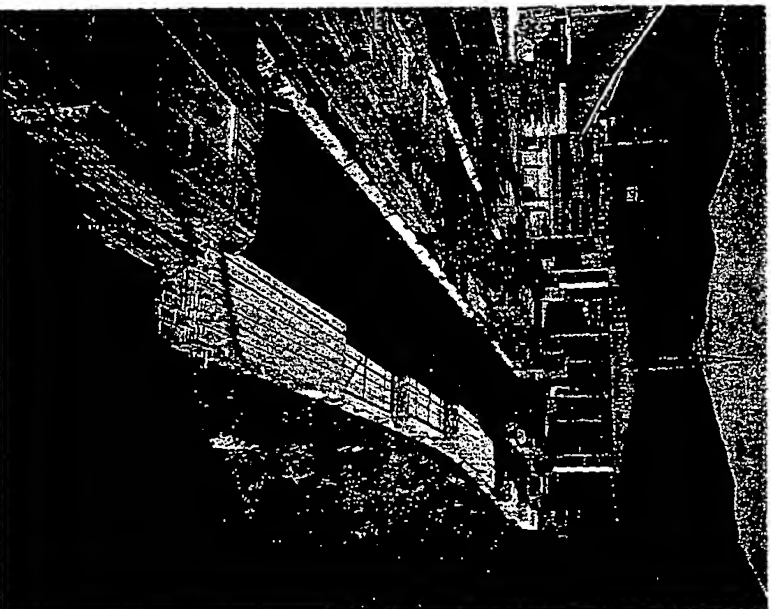
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Holz ist ein umweltfreundlicher, vielseitig verwendbarer nachwachsender Rohstoff. Seine „Produktion“ geht mit vielfältigen ökologisch bedeutsamen Wirkungen einher. Der Holzverkauf sichert der Forstwirtschaft Einnahmen, die auch die Finanzierung von Maßnahmen für die Schutz- und Erholungsfunktionen des Waldes ermöglichen. Für Produktion und Bearbeitung von Holz wird vergleichsweise wenig Energie benötigt. Naturbelassenes Holz fügt sich in den Naturkreislauf ein, ohne umweltbelastende Rückstände zu hinterlassen. Die zunehmend gewichtiger werdende Diskussion über den Treibhauseffekt kann zu einer Renaissance des nachhaltig erneuerbaren Energieträgers Holz führen.

Holzwirtschaft

Im Wirtschaftsgeschehen Deutschlands spielt die Holzwirtschaft rein zahlenmäßig eine relativ bescheidene Rolle. Zusammen mit der Papierindustrie erzielte sie 1997 einen Umsatz von 167 Mrd. DM; 1997 waren rd. 700.000 Arbeitskräfte in der Holzwirtschaft beschäftigt. Dies entspricht einem Anteil von ca. zwei Prozent aller Beschäftigten. Der Holzwirtschaft, wie auch der Forstwirtschaft, kommt für die regionale Wirtschafts- und die ländliche Beschäftigungsstruktur eine besondere Bedeutung zu, da sie überwiegend aus kleinen und mittleren Betrieben besteht und meist in ländlichen Gebieten angesiedelt ist. Lediglich in einzelnen kapitalintensiven Sektoren, wie in der Holzwerkstoff- oder Papierindustrie, überwiegen wenige Anbieter mit hohen Marktanteilen. Deutschland zählt nicht nur in Europa, sondern weltweit zu den bedeutendsten „Holzländern“. Das gilt sowohl bei der Produktion als auch beim Außenhandel mit Holz und Holz-

erzeugnissen. Die wichtigsten Handelspartner sind die Mitgliedstaaten der EU. Trotz eines hohen, nachhaltig nutzbaren Holzzuwachses von 57 Mio. Kubikmeter (m³) im Jahr, der jedoch nur zu 70 Prozent ausgeschöpft wird und einer im internationalen Vergleich mit an der Spitze liegenden Altpapiereinsatzquote von 59 Prozent ist Deutschland nicht in der Lage, seinen Bedarf an Holz und Produkten aus den eigenen Wäldern zu decken. Sulfatzellstoff als größtes Defizitsortiment muss aufgrund fehlender inländischer Produktionskapazitäten fast vollständig auf dem Weltmarkt beschafft werden.



Spezifische staatliche Hilfen für die Holzwirtschaft und Papierindustrie gibt es nicht. Allerdings kommen auch ihnen Maßnahmen zugute, die allgemein auf die Förderung der Struktur und des technischen Fortschrittes ausgerichtet sind.

Der Holzverbrauch lag 1997 bei ca. 90 Mio. m³ Rohholzüquivalent. Dies entspricht einem Pro-Kopf-Verbrauch von etwa 1,1 m³ Rohholzüquivalent. Damit nimmt Deutschland im internationalen Vergleich eine Mittelstellung ein. In dieser Verbrauchsangabe sind nicht nur Rohholz und Restholz enthalten, sondern auch Holz, das zur Herstellung von Halb- und Fertigwaren dient, sowie Altpapier und Gebrauchtholz.

Die Forstwirtschaft hat 1997 rd. 38 Mio. m³ Rohholz eingeschlagen und verkauft. Von dieser Menge hat allein die Sägeindustrie mehr als die Hälfte aufgenommen. Da sie zudem auf das höherwertige Stammholz zurückgreift, ist sie der mit Abstand wichtigste Partner der Forstwirtschaft.

Gesamtholzbilanz Deutschland 1997¹⁾
Millionen m³ (umgerechnet in Rohholzüquivalente)

Aufkommen		Verbleib	
Einschlag (Kalenderjahr)	38,2	Lagerbestandsaufbau	0,5
Altpapier aus Inland	32,7	Ausfuhr	67,4
Altholz zur stoffl. Verwertung	2,5	techn. Verbrauch	89,4
Einfuhr	83,9		
Lagerbestandsabbau	-		
Gesamtaufkommen	157,3	Gesamtverbleib	157,3

1) vorläufiges Ergebnis

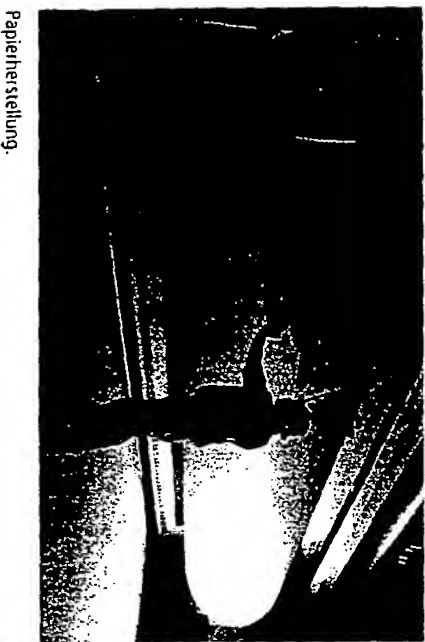
Holzbearbeitung

Die Holzbearbeitung umfasst die Herstellung von Schnittholz, Hobelware, Furnieren, Schwellen, Masten und Holzwerkstoffen. Auch die Betriebe zur Imprägnierung von Holz werden dieser ersten Produktionsstufe zugerechnet. Ihre bedeutendsten Sektoren sind die Sägeindustrie und die Spanplattenindustrie.



Holzverarbeitung

Die Holzverarbeitung umfasst die Herstellung von Möbeln, Bauelementen, Verpackungsmitteln, Holzdrehwaren, Pinseln, Bürsten etc.



Papierherstellung.

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157,3	

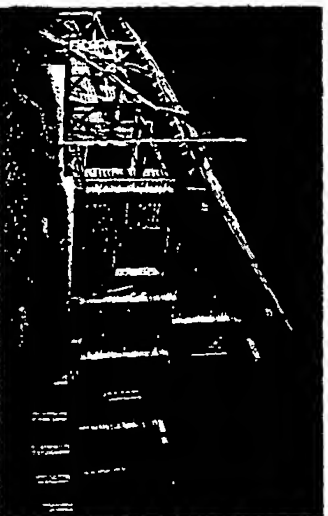
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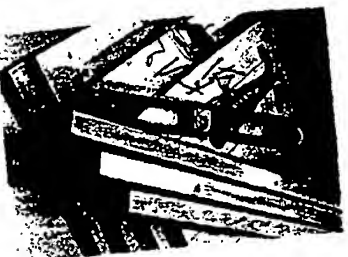
Der Umsatz der Holzverarbeitung wird überwie-
gend von der Holz- und Polstermöbelindustrie
bestritten.

Fertighausbau und Holzhausbau

Der aufstrebende Fertig- und Holzhausbau ist für
die Forstwirtschaft von wachsender Bedeutung.



weil dabei je
Einheit beson-
ders viel Holz
in Form von
Massivholz und
als Werkstoff
zum Einsatz
kommt. Beide
Bereiche profi-
tieren davon,
dass die ökolo-
gischen Vor-
züge der Holzverwendung immer mehr Aner-
kennung finden. Die deutsche Fertighaus-
industrie sieht unter anderem in dem Marktseg-
ment für flächensparendes und kostengünstiges
Bauen gute Wachstumschancen.



Handwerkliche Kleinunternehmen

Das Holzhandwerk, das Möbel erzeu-
gende Handwerk und das holznahе
Bauhandwerk wird durch rd. 50.000
Kleinunternehmen gebildet, die sich
durch flexible Produktionsweisen
auszeichnen. Sie sind in der Lage,
die Marktsegmente zu erschließen,
die von Großbetrieben nicht wirt-
schaftlich bedient werden können.
Die Betriebe sind arbeitsintensiv. Sie



leisten mit ihrer auf die spezifischen Nachfrage-
wünsche zugeschnittenen Fertigung einen wichti-
gen Beitrag zugunsten der Holzverwendung.
1997 fanden über 300.000 Beschäftigte in diesen
Handwerksbereichen Arbeit. Die Umsätze be-
trugen 1997 beim Holzhandwerk rd. 8,7 Mrd.
DM, beim Möbel erzeugenden Handwerk rd.
3,9 Mrd. DM und beim holznahen Bauhandwerk
25,5 Mrd. DM.

Papierindustrie

In der Holzstoff-, Zellstoff- und Papierindustrie
läuft seit Anfang der siebziger Jahre ein stetiger
Konzentrationsprozess, der im Zuge von Ra-
tionalisierungs- und Modernisierungsinvesti-
tionen mit Kapazitätsausweitungen einher geht.
Die Zahl der Betriebe ist im Zeitraum von 1970
bis 1997 von 331 auf 247 zurückgegangen. Die
jährliche Produktion von Papier und Pappe stieg
im gleichen Zeitraum von 5,5 Mio. Tonnen auf ca.
15,9 Mio. Tonnen an. Damit ist die Bundesrepu-

ft ihre Wettbewerbsfähigkeit will, erfordert Forschung und Entwicklung und Holzwerkstoffe. Die überwiegend strukturierten Betriebe haben zur Erhaltung notwendigen Innovationen und Entwicklungsleistungen unter

erneuerbarer Rohstoffe leicht verwendbar. Es sich gegenüber konventionellen und langfristigen Produkten, wenn die Produkte wandelbaren Nachwuchs- und Vorkenntnisse und neue erschlossen werden. Immer wieder den die gezeichnet. So führte die Leimholz- und Kleintechnik zu einem erheblichen Fortschritt im Holzbau (Hallen, Brücken usw.), Förderschwerpunkte der Bundesregierung im Bereich Holz sind vor allem die energetische Nutzung sowie die chemische Holzverwertung.

Holznutzung ist Waldpflege

Holzwirtschaft und Papierindustrie sind über die Vielfalt ihrer Erzeugnisse stark mit der Konjunktur anderer Wirtschaftszweige verflochten, insbesondere mit der Bauwirtschaft, der Verpackungsindustrie und dem Druckgewerbe. Wegen des hohen Wohnungs- und Sanierungsbedarfs – vor allem in den neuen Ländern – wird sich zumindest die Holzbearbeitung kurz- und mittelfristig beleben. Darüber hinaus bietet die Vollerfüllung des Europäischen Binnenmarktes viele Möglichkeiten einer Intensivierung wirtschaftlicher Aktivitäten.

Es ist ein wichtiges Anliegen der Bundesregierung, die Wettbewerbsfähigkeit des Roh- und Werkstoffes Holz weiter zu stärken. Wichtig ist dabei, Holz zu dem modernen, vielseitigen und umweltfreundlichen Image zu verhelfen, das ihm heute mehr denn je zusteht.

Die ökologischen Vorteile von Holz als Rohstoff werden noch nicht ausreichend gewürdigt. Zu ein wenig ist Holz eine kohlendioxidneutrale, nachwachsende Energiequelle. Der Einsatz bisher ungenutzter Potentiale des Energieträgers Holz kann den Klimaschutz verbessern. Einen Beitrag



Moderne bestandschonende Forsttechnik.

hierzu leistet das Stromsteuergesetz, das auch für die Einspeisung von Strom, der aus Holz erzeugt wurde, eine erhöhte Vergütung gewährleistet. Zum anderen erfordert die Gewinnung und Verarbeitung von Holz im Vergleich zu anderen Rohstoffen oft weniger Energie; das führt zu geringeren Umweltbelastungen. Schließlich wird durch den vermehrten Einsatz langlebiger Holzprodukte Kohlenstoff, der durch die Bäume in Form von Holz eingebunden wurde, langfristig festgelegt. Dies wirkt ebenfalls dem Treibhauseffekt entgegen. Vermintliche Fehler im Holz (z. B. Äste, Bläuefall) werden häufig zu unecht beanstandet. Auch wird Holznutzung häufig fälschlicherweise mit Schädigung des Waldes bzw. mit Waldzerstörung gleichgesetzt. Das Gegenteil ist richtig. Nachhaltige Holznutzung, wie sie in Deutschland seit mehr als 200 Jahren praktiziert wird, ist aktive Waldpflege. Dies wird nicht zuletzt daran sichtbar, dass in Deutschland die Waldfläche, Holzvorräte sowie der Anteil der Laub- und Mischwälder seit Jahrzehnten zunehmen. Die Erlöse aus dem Holzverkauf stellen die wesentliche Einkommensquelle unserer Waldbesitzer dar. Daraus müssen alle Pflegemaßnahmen finanziert werden. Aus diesem Grund ist eine effiziente Holzabsatzförderung zur Einkommenssicherung der Forstbetriebe unerlässlich. Um diese für die Zukunft sicherzustellen, trat Anfang 1999 das Holzabsatzfondsgesetz in Kraft. Mit diesem neuen Gesetz wird das Mittelaufkommen für die Holzabsatzförderung gesteigert sowie die Organisation und Wirksamkeit der Absatzförderung von Erzeugnissen der deutschen Forst- und Holzwirtschaft verbessert.

Nur durch die wirtschaftliche Holznutzung und die Verwendung von heimischem Holz können die Schutz- und Erholungsfunktionen unserer Wälder langfristig sichergestellt werden.